AMENDMENTS TO THE SPECIFICATION

Please delete the paragraph beginning "Figure 13" on line 17, page 6.

Please amend the paragraph beginning on line 19, page 6 as follows:

Figure 13 [[14]] is a schematic side cross-section of an eye demonstrating the different depth of the plane of the cornea compared to the depth of the plane of the intraocular lens plane and concentric ring pattern projection, d_1 to d_6, and sagittal (S) depth measurement for determining of corneal topography;

Please amend the paragraph beginning on line 19, page 6 as follows:

Figure 14 [[15]] is a schematic depiction of light rays and curved surfaces for wavefront aberration calculation;

Please amend the paragraph beginning on line 24, page 6 as follows:

Figure 16 is a schematic depiction of geometry for calculating the radius of the wavefront error reference sphere for calculating the difference of optical path length (OPL) of light passing through a point on the surface of the cornea to the Gaussian focal point, by which the component of refraction due to corneal topography may be calculated and then extracted (as by subtraction) from refraction measurements of the total eye;

Please amend the paragraph beginning on line 4, page 7 as follows:

~~Figure 17A – D is~~ Figures 17A-17D are an example of a set of aberration refraction maps for an eye with vertical coma in the lens with a "with-the-rule" corneal astigmatism, showing component contributions to the total aberration refraction;

Please amend the paragraph beginning on line 8, page 7 as follows:

~~Figure 18A – D is~~ Figures 18A-18D are an example of a set of aberration refraction maps for an eye with horizontal coma in the lens with a spherical cornea, showing component contributions to the total aberration refraction; and

Please amend the paragraph beginning on line 12, page 7 as follows:

~~Figure 19A – D is~~ Figures 19A-19D are an example of a set of aberration refraction maps for an eye with asymmetric astigmatism that causes high order corneal aberrations, showing component contributions to the total aberration refraction.

Please amend the paragraph beginning on line 26, page 35 as follows:

For better understanding of the invention, reference is made to Fig[[s]]. 13 showing an ~~standard~~ anatomical model[[s]] of a human eye ~~with standard or model dimensions indicated~~. It will be understood that the anterior plane or surface of the cornea ~~corneal~~ (Corneal Plane) and the anterior plane or

surface of the lens (Lens Plane) are offset by about 3.5 mm at (CL) measured along the optic axis. The index of refraction for air is n(0)=1.0, the index of refraction of the cornea and aqueous is n(c)=1.337 and n(a)=1.337, the index of refraction of the lens is n(l)=1.420 (the index of refraction of the lens typically varies slightly form the anterior surface to the posterior surface from about 1.386-1.406). The Optical Path Length Reference Sphere is modeled by OPL_{REF} + Rg x n_1 and the Optical Path Length at Point S is modeled by $OPL_S = (d_0 X n_0) + (d_1 X n_1)$. Aberrations occurring at the cornea effectively act along the entire depth of the eye from the cornea to the retina (CL) and aberrations caused by the lens effectively act along the shorter distance from the lens to the retina (LR). Thus it can be seen that changing the shape of the cornea to correct for total aberration refraction can be inaccurate where the erroneous component of refraction is actually located at the lens.

Please amend the paragraph beginning on line 23, page 37 as follows:

The calculations required for determining wave front aberrations and then extracting the component contributed by the cornea may be better understood with reference for Fig. 14 [[15]] in which one example for determining the corneal topography using placido rings is schematically depicted. [[a]] A pattern of concentric rings are projected onto the cornea. Using the evenly spaced concentric rings the elevation or Sagitall Depth of points on each of the consecutive rings is derived with either Arc-step or spherical curve fitting.

Alternatively, the elevation can be measured by digital slit lamp stereography 3D[[)]] or triangulation such as with an Orbscan device or a Pars Topo device.

Please amend the paragraph beginning on line 9, page 38 as follows:

Fig. 15 [[16]], shows the basic geometry for ray tracing analysis involved in the calculation of wave front aberration. An incoming ray intersects the exit pupil at point P0 and then intersects the corneal surface at P1. the ray is then refracted a at P1. the intersection of this refracted ray with the wavefront is at P2 and with the reference sphere at P3. the wave front, the reference sphere, and the corneal surface all pass through the origin as indicated in FIG. 16. Thus the optical path length from P0 to P1 to P2 must be zero as follows:

Please amend the paragraph beginning on line 7, page 39 as follows:

From the measured topography of the cornea a reference curve (sphere) is derived for anterior cornea at the pupil center point coincident with the optical axis. The calculation of the wavefront error reference sphere employs the geometry illustrated in Figs. 16A-16D [[17]]. The reference sphere has its front vertex at the origin so that there is no distance between the refracting surface and the reference sphere. Thus, calculations are made to find the center of the reference sphere. For perfect focus, at each intersection point S the optical path length of S.sub.z.times.n.sub.0+.vertline.C-S.vertline..times.n.sub.1 is equal to the reference radius R.times.n.sub.1 as indicated in (6).

Please amend the paragraph beginning on line 14, page 40 as follows:

~~Figure 17A-D is~~ Figures 16A-16D are an exemplary set of aberration refraction maps for an eye with vertical coma in the lens with a "with-the-rule" corneal astigmatism, showing component contributions to the total aberration refraction. These figures are derived from a method for measuring the aberration refraction of the components of the eye, includes measuring the total aberration refractive characteristics of the eye measuring the corneal shape of the eye and therefore its refractive power, calculating the aberrations of the cornea from the refractive power, calculating the difference between the values of the total aberration refractive characteristics of the total eye and the cornea, storing refractive characteristics measured and calculated above, transforming the refractive characteristics of the components into continuous three-dimensional distributions of the refractive characteristics and displaying the three dimensional distributions of the refractive characteristics.

Please amend the paragraph beginning on line 16, page 42 as follows:

Referring again to Figures 16A-16D ~~17A-D~~, the lower right hand corner, Fig. [[17]]16A, shows a corneal topography map derived from measurements that may be obtained with ray tracing or with standard concentric ring pattern projection or checkerboard pattern projection and sagittal depth measuring techniques using devices such as are available from EyeSys. Here a corneal topography map is shown demonstrating with-the-rule astigmatism. The upper right hand corner, Fig. [[17]]16B, demonstrates a wavefront map of the

total higher order aberrations in the same eye from a ray tracing measurement as with a Tracey Technologies instrument. Vertical coma is clearly seen as the dominant higher order aberration in this eye. By performing Zernike analysis on the corneal topography map the higher order aberrations generated exclusively by the cornea can be calculated and is shown in the lower left hand corner map, Fig. [[17]]16C. In this case, it clearly shows a typical pattern of spherical aberration. By "subtracting" this map from the higher order aberration map of the total eye measured by the Tracey instrument, a wavefront map of the higher order aberrations generated by the lens is produced as shown in the upper left hand corner, Fig. [[17]]16D. This result clearly reveals that the source of the vertical coma in the eye is primarily from the lens.

Please amend the paragraph beginning on line 4, page 43 as follows:

Figures 17A-17D are ~~18A-D is~~ an exemplary set of aberration refraction maps for an eye with horizontal coma in the lens with a spherical cornea, showing component contributions to the total aberration refraction. The lower right hand corner, Fig. [[18]]17A, shows a standard projected rings corneal topography map demonstrating a normal spherical cornea. The upper right hand corner, Fig. [[18]]17B is a wavefront map of the total higher order aberrations in the same eye from a Tracey measurement. Horizontal coma with a little trefoil are seen as the major higher order aberrations in this eye. By performing Zernike analysis on the corneal topography map the higher order aberrations generated by the cornea which are shown to be mostly spherical aberration, Fig. [[18]]17C.

By subtracting this map from the higher order aberration map of the total eye measured by the Tracey a wavefront map of the higher order aberrations of the lens is produced. This map in the upper left hand corner, Fig. [[18]] 17D, reveals that the source of the horizontal coma and trefoil in this eye is primarily the lens.

Please amend the paragraph beginning on line 18, page 43 as follows:

Figures 18A-18D are ~~19A-D is~~ an exemplary set of aberration refraction maps for an eye with asymmetric astigmatism that causes higher order (H-O) corneal aberrations, showing component contributions to the total aberration refraction. The lower right hand corner, Fig. [[19]]18A, shows a standard projected rings (EyeSys) corneal topography map demonstrating asymmetric astigmatism which is common with a displaced corneal apex. The upper right hand corner, Fig. [[19]]18B, demonstrates a wavefront map of the total higher order aberrations in the same eye from a Tracey measurement. Spherical aberration and some vertical coma are seen as the major higher order aberrations in this eye. By performing Zernike analysis on the corneal topography map the higher order aberrations generated by the cornea can be calculated, Fig. [[19]]18C. This analysis shows a similar pattern of spherical aberration and vertical coma as in the Tracey total higher order aberration map in the upper right, Fig. [[19]]18B. The higher order aberrations of the lens in the upper left, Fig. [[19]]18D, show a mostly green map indicating little higher order aberrations. Therefore, the higher order aberrations of the entire eye are generated primarily by the cornea. This eye would is ideally suited for custom-driven LASIK.

Please amend the paragraph beginning on line 4, page 44 as follows:

Because of the offset between the plane of the cornea and the plane of the lens (see Fig. 13 [[14]]) the amount of custom LASIK ablation at each point on the cornea is adjusted, or the form of the lens is adjusted, to compensate for the difference that results from the relative offset positions of the cornea and the lens. Thus, by knowing which portion or the aberration is actually caused by which component of the eye corrections applied either at the cornea or at the lens can be made to more accurately provide vision correction.